Preface to Third Edition

The third edition of *Traumatic Dental Injuries – A Manual* includes several new aspects of dental traumatology and an updating of existing material. The new sections that have been included describe soft tissue injuries associated with dental trauma, show how decoronation of ankylosed anterior teeth in adolescents can preserve the alveolar process for later implant placement or prosthodontic restoration and identify predictors for pulpal and periodontal ligament healing complications as well as for tooth loss. Furthermore the use of an internet-based interactive *Dental Trauma Guide* to predict healing complication for individual trauma scenarios is introduced. An added bonus is an enclosed DVD that shows animated treatment procedures for all trauma entities.

J. O. Andreasen, L. K. Bakland, M. T. Flores, F. M. Andreasen, L. Andersson
Copenhagen, January 2011
Preface to Second Edition

In this second edition, the epidemiological section on global trauma frequencies has been updated and all chapters have been revised, especially with respect to the urgency of acute treatment. Furthermore, the chapter on prevention of oral injuries has been expanded. New chapters include diagnosis of pulp and periodontal healing complications, long-term prognosis of the various trauma entities, and information to the patient subsequent to emergency treatment. Finally, a chapter has been included which deals with the principles of endodontic treatment of traumatized teeth.

J. O. Andreasen, F. M. Andreasen, L. K. Bakland, M. T. Flores
Copenhagen, January 2003

Preface to First Edition

In Traumatic Dental Injuries – A Manual, we present the highlights of dental traumatology in a format which will be a ready reference for general practitioners and aid dental students in their studies. Each chapter is designed to describe the principles in the diagnosis and treatment of the specific traumatic dental injury, including treatment objectives, treatment parameters and long-term expectations based on existing long-term studies of various trauma entities. In order to standardize diagnostic and treatment procedures, examination forms and follow-up protocol are provided in the appendices. As no type of dental trauma is ‘perfect’, a given injury type has been generated electronically by a medical artist, in order to enhance similarities and differences between the various injury groups. Periodontal and pulpal healing for the given injuries are based on recent long-term follow-up studies.

Finally, information to the public is also presented. As the best treatment result follows prompt emergency care, informed individuals at the scene of the injury can aid the dental practitioner in optimizing treatment and hopefully in preventing injuries.

It is the authors’ hope that Traumatic Dental Injuries – A Manual will fill the gap in dental education and give dental trauma its full birthright.

J. O. Andreasen, F. M. Andreasen, L. K. Bakland, M. T. Flores
Copenhagen, January 1999
Contributors

JENS O. ANDREASEN, DDS, ODONT DR. HC, FRCS
Department of Oral and Maxillofacial Surgery
University Hospital (Rigshospitalet)
Copenhagen
Denmark

LEIF K. BAKLAND, DDS
Diplomate, American Board of Endodontics
Ronald E. Buell Professor of Endodontics
School of Dentistry, Loma Linda University
Loma Linda, California
USA

MARIA T. FLORES, DDS
Professor of Pediatric Dentistry
Faculty of Dentistry
University of Valparaiso
Valparaiso
Chile

FRANCES M. ANDREASEN, DDS, DR. ODONT
Research Associate
Department of Oral and Maxillofacial Surgery
University Hospital (Rigshospitalet)
Copenhagen
Denmark

LARS ANDERSSON, DDS, ODONT DR.
Professor of Oral and Maxillofacial Surgery
Faculty of Dentistry
Kuwait University
Kuwait City
Kuwait
## Contents

- Epidemiology of Traumatic Dental Injuries 8
- Pathophysiology and Consequences of Dental Trauma 10
- Classification of Dental Injuries 16
- Examination and Diagnosis 18
- Diagnosis of Pulpal Healing Complications 22
- Diagnosis of Periodontal Healing Complications 24
- Treatment Priorities after Dental Trauma 26
- Crown Fracture without Pulp Exposure 28
- Crown Fracture with Pulp Exposure 30
- Crown-Root Fracture 32
- Root Fracture 34
- Alveolar Process Fracture 36
- Concussion 38
- Subluxation 40
- Extrusive Luxation 42
- Lateral Luxation 44
- Intrusive Luxation 46
- Avulsion 48
- Injuries to the Primary Dentition 54
- Soft Tissue Injuries 58
- Splinting 62
- Endodontic Considerations in Dental Trauma 64
- Decoronation of Ankylosed Teeth in Adolescents 68
- Predictors for Healing Complications 70
- Tooth Survival in the Permanent Dentition 74
- Information for the Patient About Dental Trauma 76
- Information for the Public About Dental Trauma 78
- Prevention of Traumatic Dental Injuries 80
- Appendices 84
- References 88
- Index 97
Epidemiology of Traumatic Dental Injuries

OBJECTIVES

1. Recognize trauma incidence and prevalence in the primary and permanent dentitions.
2. Recognize peak incidences of trauma in relation to age and sex.
3. Recognize typical causes of trauma.

TRAUMA PREVALENCE
The prevalence (i.e. the number of injuries up to a given age) of traumatic dental injuries has been examined in many countries, usually reporting very high figures. It should, however, be noted that most of these studies represent prevalences in various age groups, and therefore these prevalences cannot be compared. When prevalences are specified for 5- and 12-year-olds, the figures can be seen in the maps below. Please note that only countries where reliable figures were available have been included and color-coded.

TRAUMA PREVALENCE IN 5-YEAR-OLD CHILDREN
In 5-year-old children, approximately one-third have suffered a traumatic dental injury involving primary teeth, most often tooth luxation; boys have a slightly higher frequency than girls.

TRAUMA PREVALENCE IN 12-YEAR-OLD CHILDREN
In 12-year-old children, 20–30% of them have suffered dental injuries, with boys’ injuries occurring approximately one-third more frequently than girls. The typical injury is an uncomplicated crown fracture.
TRAUMA PREVALENCE AND INCIDENCES IN THE PRIMARY DENTITION

Annual trauma incidences (i.e. the number of new injuries occurring during a year) peak in the primary dentition at 2–3 years of age, when motor coordination is developing and the children start moving around on their own. 1,2

TRAUMA PREVALENCE AND INCIDENCES IN THE PERMANENT DENTITION

In the permanent dentition, peak incidence for boys is found at 9–10 years, during which time vigorous playing and sports activities become more frequent. 1,2

Longitudinal studies during one year have shown incidences between 1.3 and 4% for school children and 0.4% for all ages in the population of a society. 1

ETIOLOGY OF TRAUMA

The most common causes of injuries in the permanent dentition are falls, followed by traffic injuries, acts of violence and sports accidents. 3

ETIOLOGY OF TRAUMA IN VARIOUS AGE GROUPS

In preschool children (0–6 years) the injuries mainly result from falling and usually occur in the home environment during day time.

In school children (7–15 years) the injuries mainly result from being pushed and hit, and from falling; these occur mainly in school or sports areas during day time.

In adolescents and adults the injuries mainly result from push/hit injuries which predominantly occur during leisure hours. 4